

MMWR

Supplement

MORBIDITY AND MORTALITY WEEKLY REPORT

The Surgeon General's 1989 Report on Reducing the Health Consequences of Smoking: 25 Years of Progress

Executive Summary

**U.S. Department of Health and Human Services
Public Health Service
Centers for Disease Control
Center for Chronic Disease Prevention and Health Promotion
Office on Smoking and Health
Rockville, Maryland 20857**

Supplements to the *MMWR* are published by the Epidemiology Program Office, Centers for Disease Control, Public Health Service, U.S. Department of Health and Human Services, Atlanta, Georgia 30333.

SUGGESTED CITATION

Centers for Disease Control. The Surgeon General's 1989 Report on Reducing the Health Consequences of Smoking: 25 Years of Progress (Executive Summary). *MMWR* 1989;38 (Suppl. no. S-2): [Inclusive page numbers].

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Copies can be purchased from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402-9325. Telephone: (202) 783-3238.

NOTICE

This supplement to the *MMWR* (Volume 38, No. S-2) is a reprint of the Executive Summary of the Surgeon General's report entitled *Reducing the Health Consequences of Smoking: 25 Years of Progress*, released January 1989. The report is included in the *MMWR* series of publications so that the material may be readily accessible to the public health community.



THE SECRETARY OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C. 20201

DEC 29 1988

The Honorable Jim Wright
Speaker of the House
of Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

It is my pleasure to transmit to the Congress the 1989 Surgeon General's Report on the health consequences of smoking, as mandated by Section 8(a) of the Public Health Cigarette Smoking Act of 1969. The report was prepared by the Centers for Disease Control's Office on Smoking and Health.

This report, entitled Reducing the Health Consequences of Smoking: 25 Years of Progress, examines the fundamental developments over the past quarter century in smoking prevalence and in mortality caused by smoking. It highlights important gains in preventing smoking and smoking-related disease, reviews changes in programs and policies designed to reduce smoking, and emphasizes sources of continuing concern and remaining challenges.

During the past 25 years, smoking behavior has changed dramatically. Nearly half of all living adults who ever smoked have quit. The prevalence of smoking has declined steadily, with a particularly impressive decline among men. Smoking prevalence among men decreased from 50 percent in 1965 to 32 percent in 1987. As a result, lung cancer mortality rates among men are now leveling off after many decades of consistent increase. Despite this progress, the prevalence of smoking remains higher among blacks, blue-collar workers, and less-educated persons, than in the overall population. Smoking among high school seniors leveled off from 1981 through 1987 after previous years of decline.

In 1985, the last year for which estimates are available, approximately 390,000 Americans died as the result of past and current smoking. This represents more than one of every six deaths in the United States. Smoking remains the single most important preventable cause of death in our society.

To maintain our momentum toward a smoke-free society, we must focus our efforts on preventing smoking initiation and encouraging smoking cessation among high-risk populations. Increased public information activities, smoking prevention and cessation programs, and policies that encourage nonsmoking behavior should be pursued. Unless we meet this challenge successfully, smoking-related mortality will remain high well into the 21st Century.

Sincerely,

Otis R. Bowen, M.D.
Secretary

Enclosure

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FOREWORD

Twenty-five years have elapsed since publication of the landmark report of the Surgeon General's Advisory Committee on Smoking and Health. By any measure, these 25 years have witnessed dramatic changes in attitudes toward and use of tobacco in the United States. The health consequences of tobacco use will be with us for many years to come, but those consequences have been greatly reduced by the social revolution that has occurred during this period with regard to smoking.

Since 1964, substantial changes have occurred in scientific knowledge of the health hazards of smoking, in the impact of smoking on mortality, in public knowledge of the dangers of smoking, in the prevalence of smoking and using other forms of tobacco, in the availability of programs to help smokers quit, and in the number of policies that encourage nonsmoking behavior and protect nonsmokers from exposure to environmental tobacco smoke. These changes and other significant developments, as well as the overall impact of the Nation's antismoking activities, are reviewed in detail in the individual chapters of this Report. Based on this review, five major conclusions of the entire Report were reached. The first two conclusions highlight important gains in preventing smoking and smoking-related disease in the United States. The last three conclusions emphasize sources of continuing concern and remaining challenges. The conclusions are:

1. The prevalence of smoking among adults decreased from 40 percent in 1965 to 29 percent in 1987. Nearly half of all living adults who ever smoked have quit.
2. Between 1964 and 1985, approximately three-quarters of a million smoking-related deaths were avoided or postponed as a result of decisions to quit smoking or not to start. Each of these avoided or postponed deaths represented an average gain in life expectancy of two decades.
3. The prevalence of smoking remains higher among blacks, blue-collar workers, and less educated persons than in the overall population. The decline in smoking has been substantially slower among women than among men.
4. Smoking begins primarily during childhood and adolescence. The age of initiation has fallen over time, particularly among females. Smoking among high school seniors leveled off from 1980 through 1987 after previous years of decline.
5. Smoking is responsible for more than one of every six deaths in the United States. Smoking remains the single most important preventable cause of death in our society.

The last 25 years have witnessed phenomenal changes in the way Americans think about tobacco use. More people now than ever before consider smoking to be outside the social norm. Antismoking programs and policies have contributed to this change. This shift in societal attitudes is almost certain to generate additional efforts to further limit the use of tobacco.

Almost half of all living Americans who ever smoked have quit. This is especially remarkable when one takes into account the powerful media images enticing people to smoke and the powerfully addictive nature of nicotine. As the downward trends in smoking behavior continue, we can expect to see a decline in the number of premature deaths and avoidable morbidity due to smoking.

For now, however, we must recognize that continued tobacco exposure in the population will cause a great deal of human suffering for many decades. Thus, we must rest upon the laurels of the past quarter century. As long as children and adolescents continue to find reasons to use tobacco, replacements will be recruited for at least some of the smokers who quit or who die prematurely. If current trends continue, these replacements will be found disproportionately among minority groups, among the less educated, among the most economically disadvantaged, and among women.

We must look back on the last 25 years of change in order to look forward to our tasks for the future. Surely those tasks include expanding educational efforts for the young and old alike, restrictions against minors' access to tobacco, support for cessation activities, and restrictions against smoking in worksites, restaurants, transportation vehicles, and other public places.

The Public Health Service is dedicated to continuing the legacy of the 1964 Report. We hope this 25th Anniversary Report will stimulate new commitment to action by public health officials, civic leaders, educators, scientists, and the public at large on the problem of tobacco use, especially among children, adolescents, and high-risk groups.

Robert E. Windom, M.D.
Assistant Secretary for Health
Public Health Service

James O. Mason, M.D., Dr.P.H.
Director
Centers for Disease Control

PREFACE

Exactly 25 years ago, on January 11, 1964, Luther L. Terry, M.D., Surgeon General of the U.S. Public Health Service, released the report of the Surgeon General's Advisory Committee on Smoking and Health. That landmark document, now referred to as the first Surgeon General's Report on Smoking and Health, was America's first widely publicized official recognition that cigarette smoking is a cause of cancer and other serious diseases.

On the basis of more than 7,000 articles relating to smoking and disease already available at that time in the biomedical literature, the Advisory Committee concluded that cigarette smoking is a cause of lung cancer and laryngeal cancer in men, a probable cause of lung cancer in women, and the most important cause of chronic bronchitis. The Committee stated that "Cigarette smoking is a health hazard of sufficient importance in the United States to warrant appropriate remedial action."

What would constitute "appropriate remedial action" was left unspecified. But the release of the report was the first in a series of steps, still being taken 25 years later, to diminish the impact of tobacco use on the health of the American people.

This 1989 Report, the 20th in a series of Surgeon General's Reports on the Health Consequences of Smoking, spells out the dramatic progress that has been achieved in the past quarter century against one of our deadliest risks.

The circumstances surrounding the release of the first report in 1964 are worth remembering. The date chosen was a Saturday morning, to guard against a precipitous reaction on Wall Street. An auditorium in the State Department was selected because its security could be assured—it had been the site for press conferences of the late President John F. Kennedy, whose assassination had occurred less than 2 months earlier.

The first two copies of the 387-page, brown-covered report were hand delivered to the West Wing of the White House at 7:30 on that Saturday morning. At 9:00, accredited press representatives were admitted to the auditorium and "locked in," without access to telephones. Surgeon General Terry and his Advisory Committee took their seats on the platform. The Report was distributed and reporters were allowed 90 minutes to read it. Questions were answered by Dr. Terry and his Committee members. Finally, the doors were opened and the news was spread. For several days, the Report furnished newspaper headlines across the country and lead stories on television newscasts. Later it was ranked among the top news stories of 1964.

During the quarter century that has elapsed since that report, individual citizens, private organizations, public agencies, and elected officials have tirelessly pursued the Advisory Committee's call for "appropriate remedial action." Early on, the U.S. Congress adopted the Federal Cigarette Labeling and Advertising Act of 1965 and the

Public Health Cigarette Smoking Act of 1969. These laws required a health warning on cigarette packages, banned cigarette advertising in the broadcast media, and called for an annual report on the health consequences of smoking.

In 1964, the Public Health Service established a small unit called the National Clearinghouse for Smoking and Health (NCSH). Through the years, the Clearinghouse and its successor organization, the Office on Smoking and Health, have been responsible for the 20 reports on the health consequences of smoking previously mentioned, eight of which have been issued during my tenure as Surgeon General. In close cooperation with voluntary health organizations, the Public Health Service has supported highly successful school and community programs on smoking and health, has disseminated research findings related to tobacco use, and has ensured the continued public visibility of antismoking messages.

Throughout this period, tremendous changes have occurred. As detailed in this Report, we have witnessed expansion in scientific knowledge of the health hazards of smoking, growing public knowledge of the dangers of smoking, increased availability of programs to prevent young people from starting to smoke and to help smokers quit, and widespread adoption of policies that discourage the use of tobacco.

Most important, these developments have changed the way in which our society views smoking. In the 1940s and 1950s, smoking was chic; now, increasingly, it is shunned. Movie stars, sports heroes, and other celebrities used to appear in cigarette advertisements. Today, actors, athletes, public figures, and political candidates are rarely seen smoking. The ashtray is following the spittoon into oblivion.

Within this evolving social milieu, the population has been giving up smoking in increasing numbers. Nearly half of all living adults who ever smoked have quit. The most impressive decline in smoking has occurred among men. Smoking prevalence among men has fallen from 50 percent in 1965 to 32 percent in 1987. These changes represent nothing less than a revolution in behavior.

The antismoking campaign has been a major public health success. Those who have participated in this campaign can take tremendous pride in the progress that has been made.

The analysis in this Report shows that in the absence of the campaign, there would have been 91 million American smokers (15 to 84 years of age) in 1985 instead of 56 million. As a result of decisions to quit smoking or not to start, an estimated 789,000 smoking-related deaths were avoided or postponed between 1964 and 1985. Furthermore, these decisions will result in the avoidance or postponement of an estimated 2.1 million smoking-related deaths between 1986 and the year 2000.

This achievement has few parallels in the history of public health. It was accomplished despite the addictive nature of tobacco and the powerful economic forces promoting its use.

The Remaining Challenges

Despite this achievement, smoking will continue as the leading cause of preventable, premature death for many years to come, even if all smokers were to quit today. Smoking cessation is clearly beneficial in reducing the risk of dying from smoking-related

diseases. However, for some diseases, such as lung cancer and emphysema, quitting may not reduce the risk to the level of a lifetime nonsmoker even after many years of abstinence. This residual health risk is one reason why approximately 390,000 Americans died in 1985 as the result of smoking, even after two decades of declining smoking rates.

The critical message here is that progress in curtailing smoking must continue, and ideally accelerate, to enable us to turn smoking-related mortality around. Otherwise, the disease impact of smoking will remain high well into the 21st century.

Just maintaining the current rate of progress is a challenge. Compared with non-smokers, smokers are disproportionately found in groups that are harder to reach, and this disparity may increase over time. Greater effort and resources will need to be devoted to achieve equivalent reductions in smoking among those whose behavior has survived strong, countervailing social pressures.

Today, thanks to the remarkable progress of the past 25 years, we can dare to envision a smoke-free society. Indeed it can be said that the social tide is flowing toward that bold objective. To maintain momentum, we need to direct special attention to the following groups within our society:

Children and Adolescents

As a pediatric surgeon, and now as Surgeon General, I have dedicated my career to protecting the health of children. In the case of smoking, children and adolescents hold the key to progress toward curbing tobacco use in future generations.

If the adult rate of smoking were to continue at the present level, the impact of smoking on the future health and welfare of today's children would be enormous. Research has shown that one-fourth or more of all regular cigarette smokers die of smoking-related diseases. If 20 million of the 70 million children now living in the United States smoke cigarettes as adults (about 29 percent), then at least 5 million of them will die of smoking-related diseases. This figure should alarm anyone who is concerned with the future health of today's children.

Two additional factors make smoking among young people a preeminent public health concern: (1) the age of initiation of smoking, and (2) nicotine addiction. As this Report shows, four-fifths of smokers born since 1935 started smoking before age 21. The proportion of smokers who begin smoking during adolescence has been increasing over time, particularly among women.

In the Teenage Smoking Survey conducted by the Department of Health, Education, and Welfare in 1979, respondents were asked, "What would you say is the possibility that five years from now you will be a cigarette smoker?" Among smokers, half answered "definitely not" or "probably not." This response suggests that many children and adolescents are unaware of, or underestimate, the addictive nature of smoking. The predecessor to this volume, *The Health Consequences of Smoking: Nicotine Addiction*, provided a comprehensive review of the evidence that cigarettes and other forms of tobacco are addicting and that nicotine is the drug in tobacco that causes addiction.

These two factors refute the argument that smoking is a matter of free choice. Most smokers start smoking as teenagers and then become addicted. By the time smokers

become adults, when they would be expected to have greater appreciation of the health effects of smoking, many have difficulty quitting. Today, 80 percent of smokers say they would like to quit; two-thirds of smokers have made at least one serious attempt to quit. Characteristically, people quit smoking several times before becoming permanent ex-smokers.

The prevalence of daily smoking among high school seniors leveled off from 1981 through 1987, at about 20 percent, after previous years of decline. Each day, more than 3,000 American teenagers start smoking. If we can substantially reduce this number, we will soon achieve a major impact on smoking prevalence among adults. Although research efforts in prevention are increasing, prevention programs are not yet reaching large numbers of young people. The public health community should pay at least as much attention to the prevention of smoking among teenagers as it now pays to smoking cessation among adults. Comprehensive school health education, incorporating tobacco use prevention, should be provided in every school throughout the country.

Women

Since release of the first Surgeon General's Report, the prevalence of smoking among women has declined much more slowly than among men. If current trends continue, smoking rates will be about equal among men and women in the mid-1990s, after which women may smoke at a higher rate than men.

The public health impact of this trend is already being seen. Lung cancer mortality rates are increasing steadily among women, and estimates by the American Cancer Society indicate that this disease has now overtaken breast cancer as the number one cause of cancer death among women. Smoking during pregnancy poses special risks to the developing fetus and is an important cause of low birthweight and infant mortality. Smoking and oral contraceptive use interact to increase dramatically the risk of cardiovascular disease. Women's organizations and women's magazines have paid scant attention to these issues.

The key to addressing this problem is the prevention of smoking among female adolescents. The disparity in smoking prevalence between men and women is primarily a reflection of differences in smoking initiation. Smoking initiation has declined much more slowly among females than among males. This difference is due, in large part, to increasing initiation rates among less educated young women. Among high school seniors, the prevalence of daily smoking has been higher among females than among males each year since 1977.

In summary, women, and especially female adolescents not planning higher education, are an important target group for prevention activities.

Minorities

Smoking rates are higher in certain racial and ethnic minority groups, many of which already suffer from a disproportionate share of risk factors and illness. In particular, smoking prevalence has been consistently higher among black men than among white

men (41 and 31 percent, respectively, in 1987). In addition, the limited data available show higher rates of smoking among Hispanic men than among white men.

Trends in smoking initiation, prevalence, and quitting among blacks and whites show similar rates of change from 1974 to 1985. Thus, the gap in smoking prevalence between blacks and whites is not widening. However, to reduce the gap in smoking between blacks and whites, prevention efforts must focus on blacks more successfully. The public health community is only now beginning to address this problem. The urgency of the situation is greater because cigarette companies are increasingly targeting their marketing efforts at blacks and Hispanics.

Blue-collar Workers

The prevalence of smoking has been consistently higher among blue-collar workers than among white-collar workers. In 1985, 40 percent of blue-collar workers smoked compared with 28 percent of white-collar workers. Again, blue-collar workers are a major target of cigarette company advertising and promotional campaigns. Worksites smoking cessation programs, employee incentive programs, and policies banning or restricting smoking at the workplace are effective strategies to reach this group.

Toward a Smoke-Free Future

Because the general health risks of smoking are well known, because smoking is banned or restricted in a growing number of public places and worksites, and because smoking is losing its social acceptability, the overall prevalence of smoking in our society is likely to continue to decline. The progress we have achieved during the past quarter century is impressive.

Equally impressive, however, are the challenges we face. During the next quarter century and beyond, progress will be slow, and smoking-related mortality will remain high, unless the health community more effectively reaches children and adolescents, women, minorities, and blue-collar workers. Organizations that represent these groups can contribute substantially to the antismoking movement. In large part, the future health of these populations will depend on the degree to which schools, educators, parents' organizations, women's groups, minority organizations, employers, and employee unions join the campaign for a smoke-free society. Here in the United States, such a society is an attainable long-term goal.

Unfortunately, the looming epidemic of smoking and smoking-related disease in developing countries does not encourage similar optimism. According to the World Health Organization, increases in cigarette consumption between 1971 and 1981 exceeded population growth in all developing regions: 77 percent in Africa, and by 30 percent in Asia and Latin America.

The topic of tobacco and health internationally, although critically important, especially for developing nations, is beyond the scope of this Report. I can only hope that

the lessons we have learned in the United States, as detailed in this Report, will help other countries take the necessary steps to avoid the devastation caused by use of tobacco.

C. Everett Koop, M.D., Sc.D.
Surgeon General

CHAPTER 1

HISTORICAL PERSPECTIVE, OVERVIEW, AND CONCLUSIONS

Historical Perspective

Each of the last five Surgeons General of the U.S. Public Health Service (PHS) has identified cigarette smoking as one of this Nation's most significant sources of death and disease. Today, more than one of every six American deaths is the result of cigarette smoking. Smoking is responsible for an estimated 30 percent of all cancer deaths, including 87 percent of lung cancer, the leading cause of cancer mortality; 21 percent of deaths from coronary heart disease; 18 percent of stroke deaths; and 82 percent of deaths from chronic obstructive pulmonary disease. Other forms of tobacco use, including pipe and cigar smoking and use of smokeless tobacco, are also associated with significantly elevated risks of disease and death (US DHEW 1979a; US DHHS 1986b).

Although the health hazards of tobacco use have been suspected for almost 400 years, the first reported clinical impressions of a relationship between tobacco and disease date from the 18th century, when tobacco use was associated with lip cancer (US DHEW 1979a) and nasal cancer (US DHHS 1986b). However, true scientific understanding of the health effects of tobacco has been achieved only in the present century. Broders (1920) published an article in the *Journal of the American Medical Association* linking tobacco use to lip cancer, and 8 years later, Lombard and Doering (1928) published an article in the *New England Journal of Medicine* noting that heavy smoking was more common among cancer patients than among control groups. Later, Pearl (1938) observed in the journal *Science* that heavy smokers had a shorter life expectancy than nonsmokers.

During the 1930s, the Nation's increasing rate of lung cancer and other diseases prompted the initiation of epidemiologic and laboratory studies of the relationship between tobacco use and disease. In the late 1940s and early 1950s, a number of retrospective epidemiologic studies, published by Wynder and Graham (1950) and by other investigators, provided scientific evidence strongly linking smoking to lung cancer. This association was soon thereafter supported by the emerging early findings of major prospective (cohort) mortality studies, including the work of Doll and Hill (1954, 1956) in Great Britain and Hammond and Horn (1958a, 1958b) in the United States. The strength and consistency of these results, combined with evidence from laboratory and autopsy studies, led a national scientific study group to conclude in 1957 that the relationship between smoking and lung cancer was causal (Study Group on Smoking and Health 1957).

On July 12 of that year, U.S. Surgeon General Leroy Burney issued a statement declaring that "The Public Health Service feels the weight of the evidence is increasingly pointing in one direction; that excessive smoking is one of the causative factors in lung cancer" (US PHS 1964). Two years later, in 1959, Surgeon General Burney said that "The weight of evidence at present implicates smoking as the principal factor in the increased incidence of lung cancer" (Burney 1959).

Increases in chronic diseases in other parts of the world led health authorities in other countries to examine the relationship between tobacco and disease, particularly in Europe and Scandinavia. In 1957, the British Medical Research Council reported that a major part of the increase in lung cancer was attributable to smoking (British Medical Research Council 1957). Later, the Royal College of Physicians (1962) issued a

landmark document on smoking and health that concluded that "Cigarette smoking is the most likely cause of the recent world-wide increase in deaths from lung cancer . . . is an important predisposing cause of the development of chronic bronchitis . . . probably increases the risk of dying from coronary heart disease...has an adverse effect on healing of [gastric and duodenal] ulcers . . . [and] may be a contributing factor in cancer of the mouth, pharynx, oesophagus, and bladder."

On June 1, 1961, the presidents of the American Cancer Society, the American Public Health Association, the American Heart Association, and the National Tuberculosis Association (now the American Lung Association) urged President John F. Kennedy to establish a commission to study the health consequences of smoking. Representatives of these organizations met with Surgeon General Luther L. Terry in January 1962 to reiterate their call for action. In April, the Surgeon General presented a detailed proposal for an advisory group to reevaluate the position adopted by the Public Health Service in 1959. In calling for the advisory group, Dr. Terry cited new research on the adverse health effects of tobacco, a request from the Federal Trade Commission for guidance on policy regarding the labeling and advertising of tobacco products, and the findings in the new report of the Royal College of Physicians.

On July 27, 1962, following consultations between the White House and the Public Health Service, the Surgeon General held a meeting to define the work of an expert advisory group and to identify candidates for the committee. Meeting with the Surgeon General were representatives of the American Cancer Society, the American College of Chest Physicians, the American Heart Association, the American Medical Association, the Tobacco Institute, the Food and Drug Administration, the National Tuberculosis Association, the Federal Trade Commission, and the President's Office of Science and Technology. The group agreed on a list of more than 150 scientists and physicians. Each of the organizations had the right to veto any of the names on the list for any reason. Persons who had taken a public position on smoking and health were not considered for inclusion on the advisory committee.

Dr. Terry selected 10 individuals from the list to serve on the Surgeon General's Advisory Committee on Smoking and Health: Stanhope Bayne-Jones, M.D., LL.D., former Dean, Yale School of Medicine; Walter J. Burdette, M.D., Ph.D., University of Utah; William G. Cochrane, M.A., Harvard University; Emmanuel Farber, M.D., Ph.D., University of Pittsburgh; Louis F. Fieser, Ph.D., Harvard University; Jacob Furth, M.D., Columbia University; John B. Hickam, M.D., Indiana University; Charles LeMaistre, M.D., University of Texas; Leonard M. Schuman, M.D., University of Minnesota; and Maurice H. SeEVERS, M.D., Ph.D., University of Michigan.

The Advisory Committee held nine meetings from November 1962 through December 1963, during which they reviewed all the available data from animal laboratory experiments, clinical and autopsy studies, and retrospective and prospective epidemiologic studies. The Committee had access to over 7,000 publications pertaining to smoking and health, including more than 3,000 articles reporting research findings published after 1950. In evaluating evidence linking smoking to disease, the Committee restricted judgments of a causal relationship to those associations for which the evidence was (1) consistent, (2) strong, (3) specific, (4) supportive of appropriate temporal relationships, and (5) coherent (US PHS 1964).

The final Report of the Advisory Committee was released on January 11, 1964 (US PHS 1964). It concluded that "Cigarette smoking is causally related to lung cancer in men; the magnitude of the effect of cigarette smoking far outweighs all other factors. The data for women, though less extensive, point in the same direction The risk of developing lung cancer increases with duration of smoking and the number of cigarettes smoked per day, and is diminished by discontinuing smoking."

The Report also concluded that pipe smoking is causally related to lip cancer, that cigarette smoking is causally related to laryngeal cancer in men, and that "Cigarette smoking is the most important of the causes of chronic bronchitis." The Advisory Committee identified significant associations between smoking and cancer of the esophagus, cancer of the urinary bladder, coronary artery disease, emphysema, peptic ulcer disease, and low-birth-weight babies, but it did not consider the available data to be sufficient to label these associations causal.

The Committee found that male cigarette smokers had a 70-percent excess mortality rate over men who had never smoked and that female smokers also had an elevated mortality rate, although less than that of males. The Advisory Committee concluded that "Cigarette smoking is a health hazard of sufficient importance in the United States to warrant appropriate remedial action."

"Remedial action" was initiated immediately after publication of the Advisory Committee's Report, when the Federal Trade Commission (FTC) proposed that cigarette packs and advertisements bear warning labels and that strict limitations be placed on the content of cigarette advertising. With passage of the Federal Cigarette Labeling and Advertising Act of 1965 (Public Law 89-92; amended in April 1970 by Public Law 91-222), Congress preempted the FTC's recommendation: beginning in 1966, a congressionally mandated health warning appeared on all cigarette packs but not on advertisements.

The Act also required the Secretary of Health, Education, and Welfare to submit annual reports to Congress on the health consequences of smoking, together with legislative recommendations, beginning no later than mid-1967. New reports of the Surgeon General on smoking and health were issued in each calendar year beginning in 1967, except for 1970, 1976, 1977, and 1987. (In 1976, a volume of selected chapters from the 1971-75 Reports was published. The report issued in 1978 was a joint Report for the years 1977 and 1978.) Thus, the present volume, commemorating the 25th anniversary of the 1964 Report, is the 20th Report in the series. In addition, in 1986, PHS issued a report on the health consequences of using smokeless tobacco (US DHHS 1986b). Table 1 identifies the previous reports and highlights their coverage.

The reports published since the 1964 Report have confirmed the scientific judgment of the Advisory Committee and have extended its findings. The evidence available today has reinforced the Advisory Committee's judgments of causality; converted most of its "significant associations" into causal relationships, adhering to the strict criteria described in the first Report; confirmed causal associations for relationships not contemplated in the 1964 Report (e.g., the health hazards of involuntary smoking (US DHHS 1986a)); and identified additional disease associations.

Accompanying the growth and dissemination of scientific knowledge has been increased public understanding of the hazards of smoking, reflected in decreases in smok-

TABLE 1.—Surgeon General's Reports on smoking and health, 1964–88

Year	Subject/Highlights
1964	First official report of the Federal Government on smoking and health. Concluded that "Cigarette smoking is a health hazard of sufficient importance in the United States to warrant appropriate remedial action." Concluded that cigarette smoking is a cause of lung cancer in men and a suspected cause of lung cancer in women. Identified many other causal relationships and smoking-disease associations (US PHS 1964).
1967	Confirmed and strengthened conclusions of 1964 Report. Stated that "The case for cigarette smoking as the principal cause of lung cancer is overwhelming." Found that evidence "strongly suggests that cigarette smoking can cause death from coronary heart disease." 1964 Report had described this relationship as an "association." Also concluded that "Cigarette smoking is the most important of the causes of chronic non-neoplastic bronchiopulmonary diseases in the United States." Identified measures of morbidity associated with smoking (US PHS 1968a).
1968	Updated information presented in 1967 Report. Estimated smoking-related loss of life expectancy among young men as 8 years for "heavy" smokers (over 2 packs per day) and 4 years for "light" smokers (less than 1/2 pack per day) (US PHS 1968b).
1969	Also supplemented 1967 Report. Confirmed association between maternal smoking and infant low birth weight. Identified evidence of increased incidence of prematurity, spontaneous abortion, stillbirth, and neonatal death (US PHS 1969).
1971	Reviewed entire field of smoking and health, with emphasis on most recent literature. Discussed new data indicating associations between smoking and peripheral vascular disease, atherosclerosis of the aorta and coronary arteries, increased incidence and severity of respiratory infections, and increased mortality from cerebrovascular disease and nonsyphilitic aortic aneurysm. Concluded that smoking is associated with cancers of the oral cavity and esophagus. Found that "Maternal smoking during pregnancy exerts a retarding influence on fetal growth" (US DHEW 1971).
1972	Examined evidence on immunological effects of tobacco and tobacco smoke, harmful constituents of tobacco smoke, and "public exposure to air pollution from tobacco smoke." Found tobacco and tobacco smoke antigenic in humans and animals; tobacco may impair protective mechanisms of immune system; nonsmokers' exposure to tobacco smoke may exacerbate allergic symptoms; carbon monoxide in smoke-filled rooms may harm health of persons with chronic lung or heart disease; tobacco smoke contains hundreds of compounds, several of which have been shown to act as carcinogens, tumor initiators, and tumor promoters. Identified carbon monoxide, nicotine, and tar as smoke constituents most likely to produce health hazards of smoking (US DHEW 1972).
1973	Presented evidence on health effects of smoking pipes, cigars, and "little cigars." Found mortality rates of pipe and cigar smokers higher than those of nonsmokers but lower than those of cigarette smokers. Found that cigarette smoking impairs exercise performance in healthy young men. Presented additional evidence on smoking as risk factor in peripheral vascular disease and problems of pregnancy (US DHEW 1973).

TABLE 1.—Continued

Year	Subject/Highlights
1974	Tenth Anniversary Report. Reviewed and strengthened evidence on major hazards of smoking. Reviewed evidence on association between smoking and atherosclerotic brain infarction and on synergistic effect of smoking and asbestos exposure in causing lung cancer (US DHEW 1974).
1975	Updated information on health effects of involuntary (passive) smoking. Noted evidence linking parental smoking to bronchitis and pneumonia in children during the first year of life (US DHEW 1975).
1976 ^a	Compiled selected chapters from 1971-75 Reports (US DHEW 1976).
1977-78	Combined 2-year Report focused on smoking-related health problems unique to women. Cited studies showing that use of oral contraceptives potentiates harmful effects of smoking on the cardiovascular system (US DHEW 1978).
1979	Fifteenth Anniversary Report. Presented most comprehensive review of health effects of smoking ever published, and first Surgeon General's Report to carefully examine behavioral, pharmacologic, and social factors influencing smoking. Also first Report to consider role of adult and youth education in promoting nonsmoking. First Report to review health consequences of smokeless tobacco. Many new sections, including one identifying smoking as "one of the primary causes of drug interactions in humans" (US DHEW 1979a).
1980	Devoted to health consequences of smoking for women. Reviewed evidence that strengthened previous findings and permitted new ones. Noted projections that lung cancer would surpass breast cancer as leading cause of cancer mortality in women. Identified trend toward increased smoking by adolescent females (US DHHS 1980a).
1981	Examined health consequences of "the changing cigarette," i.e., lower tar and nicotine cigarettes. Concluded that lower yield cigarettes reduced risk of lung cancer but found no conclusive evidence that they reduced risk of cardiovascular disease, chronic obstructive pulmonary disease, and fetal damage. Noted possible risks from additives and their products of combustion. Discussed compensatory smoking behaviors that might reduce potential risk reductions of lower yield cigarettes. Emphasized that there is no safe cigarette and that any risk reduction associated with lower yield cigarettes would be small compared with benefits of quitting smoking (US DHHS 1981).
1982	Reviewed and extended understanding of the health consequences of smoking as a cause or contributory factor of numerous cancers. Included first Surgeon General's Report consideration of emerging epidemiologic evidence of increased lung cancer risk in nonsmoking wives of smoking husbands. Did not find evidence at that time sufficient to conclude that relationship was causal, but labeled it "a possible serious public health problem." Discussed potential for low-cost smoking cessation interventions (US DHHS 1982).
1983	Examined health consequences of smoking for cardiovascular disease. Concluded that cigarette smoking is one of three major independent causes of coronary heart disease (CHD) and, given its prevalence, "should be considered the most important of the known modifiable risk factors for CHD." Discussed relationships between smoking and other forms of cardiovascular disease (US DHHS 1983).

TABLE 1.—Continued

Year	Subject/Highlights
1984	Reviewed evidence on smoking and chronic obstructive lung disease (COLD). Concluded that smoking is the major cause of COLD, accounting for 80 to 90 percent of COLD deaths in the United States. Noted that COLD morbidity has greater social impact than COLD mortality because of extended disability periods of COLD victims (US DHHS 1984).
1985	Examined relationship between smoking and hazardous substances in the workplace. Found that for the majority of smokers, smoking is a greater cause of death and disability than their workplace environment. Risk of lung cancer from asbestos exposure characterized as multiplicative with smoking exposure. Observed special importance of smoking prevention among blue-collar workers because of their greater exposure to workplace hazards and their higher prevalence of smoking (US DHHS 1985).
1986	Focused on involuntary smoking, concluding that "Involuntary smoking is a cause of disease, including lung cancer, in healthy nonsmokers." Also found that, compared with children of nonsmokers, children of smokers have higher incidence of respiratory infections and symptoms and reduced rates of increase in lung function. Presented detailed examination of growth in restrictions on smoking in public places and workplaces. Concluded that simple separation of smokers and nonsmokers within same airspace reduces but does not eliminate exposure to environmental tobacco smoke (US DHHS 1986a).
1986 ^b	Special Report of advisory committee appointed by the Surgeon General to study the health consequences of smokeless tobacco. Concluded that use of smokeless tobacco can cause cancer in humans and can lead to nicotine addiction (US DHHS 1986b).
1988	Established nicotine as a highly addictive substance, comparable in its physiological and psychological properties to other addictive substances of abuse (US DHHS 1988).

^aExcluded from count of series volumes in text because no new evidence was reviewed.

^bExcluded from count of series volumes in text because it was a Special Report, not in the series of reports on smoking and health.

ing prevalence and, in recent years, the intensification of public and private measures to discourage smoking. A quarter century after publication of the first Report, smoking remains the leading cause of preventable premature death in our society, but per capita cigarette consumption is declining annually, and analyses of consumption and disease trends augur eventual decreases in smoking's toll.

Given these changes, the remaining toll of tobacco-related disease, and the Surgeon General's objective of a smoke-free society by the year 2000 (Koop 1984), Surgeon General C. Everett Koop devotes this 25th anniversary edition of the Surgeon General's Report to an assessment of progress against smoking in the quarter century since the first Report was published.

Highlights of Conclusions and Findings

Major Conclusions

As the present Report documents, knowledge of the health consequences of smoking has expanded dramatically since 1964, and programs and policies to combat the hazards of smoking have proliferated. The essential chapter-specific conclusions relating to these and other topics of this Report are presented at the end of each chapter and are reproduced in the final section of this introductory chapter. The major conclusions of the entire Report, immediately following, address fundamental developments over the past quarter century in smoking prevalence and in mortality caused by smoking. The first two conclusions highlight important gains in preventing smoking and smoking-related disease in the United States. The last three conclusions emphasize sources of continuing concern and remaining challenges.

1. The prevalence of smoking among adults decreased from 40 percent in 1965 to 29 percent in 1987. Nearly half of all living adults who ever smoked have quit.
2. Between 1964 and 1985, approximately three-quarters of a million smoking-related deaths were avoided or postponed as a result of decisions to quit smoking or not to start. Each of these avoided or postponed deaths represented an average gain in life expectancy of two decades.
3. The prevalence of smoking remains higher among blacks, blue-collar workers, and less educated persons than in the overall population. The decline in smoking has been substantially slower among women than among men.
4. Smoking begins primarily during childhood and adolescence. The age of initiation has fallen over time, particularly among females. Smoking among high school seniors leveled off from 1980 through 1987 after previous years of decline.
5. Smoking is responsible for more than one of every six deaths in the United States. Smoking remains the single most important preventable cause of death in our society.

Key New Findings

While this Report is designed to provide a retrospective view of smoking and health over the past 25 years, several findings never previously documented in a report of the Surgeon General emerged during the process of reviewing and analyzing the voluminous materials consulted for the study. Discussed in detail throughout the Report, key new findings include the following:

- Cigarette smoking is a major cause of cerebrovascular disease (stroke), the third leading cause of death in the United States.
- By 1986, lung cancer caught up with breast cancer as the leading cause of cancer death in women. Women smokers' relative risk of lung cancer has increased by a factor of more than four since the early 1960s and is now comparable to the relative risk identified for men in that earlier period. Gender differences in smoking behavior are disappearing; consistent with this, gender differences in the relative risks of and mortality from smoking-related diseases are narrowing.
- Cigarette smoking is associated with cancer of the uterine cervix.
- To date, 43 chemicals in tobacco smoke have been determined to be carcinogenic.
- In 1985, approximately 390,000 deaths were attributable to cigarette smoking. This figure is greater than other recent estimates of smoking-attributable mortality, reflecting the use of higher relative risks of smoking-related diseases for women and, especially in the case of lung cancer, for men. These higher relative risks were derived from the largest and most recent prospective study of smoking and disease, conducted by the American Cancer Society.
- Disparities in smoking prevalence, quitting, and initiation between groups with the highest and lowest levels of educational attainment are substantial and have been increasing. Educational attainment appears to be the best single sociodemographic predictor of smoking.
- There is growing recognition that prevention and cessation interventions need to target specific populations with a high smoking prevalence or at high risk of smoking-related disease. These populations include minority groups, pregnant women, military personnel, high school dropouts, blue-collar workers, unemployed persons, and heavy smokers.
- One-quarter of high school seniors who have ever smoked had their first cigarette by sixth grade, one-half by eighth grade. Associated with knowledge of this fact is a growing consensus that smoking prevention education needs to begin in elementary school.
- Whereas past smoking control efforts targeting children and adolescents focused exclusively on prevention of smoking, the smoking control community has identified the need to develop cessation programs for children and adolescents addicted to nicotine.
- As of mid-1988, more than 320 local communities had adopted laws or regulations restricting smoking in public places. This compares with a total of about 90 as of the end of 1985, a more than threefold increase in 3 years. The number of new State laws restricting smoking in public places in 1987 exceeded the number passed in any preceding year.

- A growing body of evidence on the role of economic incentives in influencing health behavior has contributed to increased interest in and use of such incentives to discourage use of tobacco products. These include excise taxation of tobacco products, workplace financial incentives, and insurance premium differentials for smokers and nonsmokers.
- In marked contrast to the trends in virtually all other areas of smoking control policy, the number of legal restrictions on children's access to tobacco products has decreased over the past quarter century. Studies indicate that vendor compliance with minimum-age-of-purchase laws is the exception rather than the rule.
- The marketing of a variety of alternative nicotine delivery systems has heightened concern within the public health community about the future of nicotine addiction. The most prominent development in this regard was the 1988 test marketing by a major cigarette producer of a nicotine delivery device having the external appearance of a cigarette and being promoted as "the cleaner smoke."
- While over 50 million Americans continue to smoke, more than 90 million would be smoking in the absence of the changes in the smoking-and-health environment that have occurred since 1964.
- Quitting and noninitiation of smoking between 1964 and 1985, encouraged by changes in that environment, have been or will be associated with the postponement or avoidance of almost 3 million smoking-related deaths. That figure reflects the three-quarters of a million deaths noted in conclusion 2 above, and an additional 2.1 million deaths estimated to be postponed or avoided between 1986 and the year 2000.

Overview

Coverage of the Report

As the major conclusions and new findings suggest, progress against smoking is necessarily measured in several dimensions. Ultimately, the most important measure is the burden of mortality, morbidity, and disability associated with smoking. Secondly, changes in the prevalence of smoking and its distribution among sociodemographic groups foretell the future course of smoking-related disease. Behavioral changes in turn reflect a myriad of social and psychological influences that have evolved over the past 25 years. These include public knowledge of smoking hazards and attitudes toward the behavior; availability and effectiveness of smoking prevention and cessation programs; and adoption of smoking-related social policies, often reflections of public attitudes and opinions. At the heart of all these phenomena is the substantial and expanding body of scientific knowledge about the health consequences of smoking.

The 1989 Report examines changes in each of these dimensions over the past quarter century. The Report includes a Foreword by the Assistant Secretary for Health and the Director of the Centers for Disease Control, a Preface by the Surgeon General of the U.S. Public Health Service, and the following chapters:

- Chapter 1. Historical Perspective, Overview, and Conclusions
- Chapter 2. Advances in Knowledge of the Health Consequences of Smoking
- Chapter 3. Changes in Smoking-Attributable Mortality
- Chapter 4. Trends in Public Beliefs, Attitudes, and Opinions About Smoking
- Chapter 5. Changes in Smoking Behavior and Knowledge About Determinants
- Chapter 6. Smoking Prevention, Cessation, and Advocacy Activities
- Chapter 7. Smoking Control Policies
- Chapter 8. Changes in the Smoking-and-Health Environment: Behavioral and Health Consequences

A key to abbreviations used throughout the Report is found at the end of the volume.

Analysis of changes in scientific-medical understanding follows the core tradition of the Surgeon General's Report series. Chapter 2 summarizes current knowledge of the health consequences of smoking and examines how it has advanced, both qualitatively and quantitatively, beyond that reflected in the original Surgeon General's Report. The Chapter also summarizes knowledge of the physicochemical nature of tobacco smoke.

Chapter 3 examines the ultimate population impact of smoking-disease relationships in its review of changes in smoking-attributable mortality. The patterns of mortality have changed in predictable ways, reflecting variations in the rates and sociodemographic distribution of smoking prevalence (the subject of much of Chapter 5). In particular, smoking-attributable mortality in women has increased dramatically, the predictable consequence of the rapid growth in smoking by women in the middle decades of the century. Shifts in sociodemographic patterns of smoking, with greater prevalence now found among blue-collar workers and some minorities than among the white-collar population, presage a continuing disproportionate burden of illness for the Nation's poor and minority populations.

One element of the decision of whether or not to smoke is personal understanding of the dangers involved. Chapter 4 reviews changes in public knowledge since 1964. The most basic findings from scientific research on the health consequences of smoking have been conveyed to and accepted by the American public, at least at a generalized level. Nevertheless, survey research reveals important gaps in public understanding of the hazards of smoking. Smokers report less understanding of the basic consequences of smoking than do nonsmokers; furthermore, smokers often do not internalize, or personalize, the hazards they acknowledge as applying to smokers in general. In addition, knowledge of smoking-and-health facts beyond the most basic information is not possessed by significant numbers of Americans. Thus, a substantial educational task remains.

Although significant gaps remain, it is also clear that the public has a much better appreciation of the hazards of smoking than it did 25 years ago. Associated with the growing acceptance of smoking as a health hazard for the smoker, and more recently as a hazard for nonsmokers, is a growing public desire to restrict smoking in public places

to protect the rights of nonsmokers to breathe clean air. Opinions about smoking and the appropriate role of smoking control are also considered in Chapter 4.

The relationship between knowledge and opinion change, on the one hand, and subsequent behavior change, on the other, is quite complex. Nevertheless, substantial smoking behavior change has occurred since issuance of the first Surgeon General's Report and has often followed shifts in beliefs and opinions about smoking. The many dimensions of such behavior change are explored in Chapter 5. Part I of the Chapter examines empirical evidence on behavior change across a number of smoking behaviors and across the major sociodemographic groups. Several previous reports of the Surgeon General have included consideration of these trends (US DHEW 1979; US DHHS 1980, 1983, 1985, 1988). Part II of Chapter 5 reviews the evolution of understanding of smoking behaviors and their determinants. The 1979 Surgeon General's Report devoted several chapters to the psychological and social determinants of smoking (US DHEW 1979). Most recently, the phenomenon of nicotine addiction was reviewed thoroughly by the Surgeon General (US DHHS 1988).

Changes in public attitudes toward smoking and in the prevalence of smoking are reflected in the rapid expansion in the 1980s of State and local laws and workplace policies restricting smoking. The Nation's growing nonsmoking ethos is also reflected in more attention to both voluntary and regulatory measures intended to prevent the initiation of tobacco use or to assist smokers to quit. The number of smoking-cessation techniques and programs has expanded. Smoking policy discussions today concern such diverse activities as excise taxation, restriction of advertising and promotion of tobacco products, limitation of children's access to tobacco products, and regulation of the newly emerging nicotine-based products collectively referred to as "alternative nicotine delivery systems."

Chapters 6 and 7 examine developments over the past quarter century in voluntary programmatic efforts and public policies directed at smoking control, respectively. Chapter 6 describes separately programs directed at smoking prevention and cessation, and highlights the work of the major voluntary health associations. The Chapter reviews such diverse efforts as comprehensive school health education curricula and antismoking public service announcements on the broadcast media. Chapter 6 concludes with a brief overview of advocacy and lobbying activities related to smoking and health. Advocacy activities are purely voluntary in nature, yet most have been directed at promoting smoking control policies, particularly in recent years. As such, a discussion of advocacy serves as a logical transition between the focus of Chapter 6 on voluntary efforts to combat smoking and concentration in Chapter 7 on policy measures.

Coverage of developments in smoking control policies in Chapter 7 has few precedents in prior reports of the Surgeon General, despite the first Report's call for "appropriate remedial action" a quarter of a century ago (US PHS 1964). The major exception was the substantial attention accorded workplace and Government smoking restriction policies in the 1986 Report (US DHHS 1986a). Otherwise, the report series' principal references to policy have come in the form of legislative recommendations to the Congress. Yet, as noted above, policies intended to diminish smoking and its disease burden have become increasingly common in both the public and

private sectors. Thus, as part of the history of smoking and health, and as a determinant of progress against smoking, smoking-related policy is examined in detail in this 25th anniversary Report. Coverage of policy in Chapter 7 includes documentation of trends in specific policies, analogous to the coverage afforded smoking restrictions in the 1986 Report. Policies are grouped into three categories: policies pertaining to information and education (Part I); economic incentives (Part II); and direct restrictions (Part III). Where possible, discussion includes examination of scientific understanding of specific policy effects. Such understanding derives from a growing and increasingly sophisticated body of empirical social science research.

Collectively, the program and policy efforts discussed in Chapters 6 and 7, combined with changing public knowledge and social norms, have encouraged tens of millions of Americans not to smoke. As examined in Chapter 8, this behavioral change can be credited with the avoidance of many hundreds of thousands of premature deaths and the associated saving of millions of life-years. Chapter 8 reviews these and other findings on the behavioral and health consequences of changes in the Nation's smoking-and-health environment.

Conclusions pertaining to the findings of each of the Report's chapters are reviewed in the final section of this introductory chapter.

By all accounts, the 1964 Report of the Surgeon General's Advisory Committee is a landmark document in the history of public health and a seminal contribution to the Nation's efforts to understand and combat tobacco-related morbidity and mortality. The present Report chronicles progress against smoking in the intervening 25 years, demonstrating an extraordinary array of advances in knowledge, changes in norms and behavior, and effects on the health of the American people. By any reasonable measure, the burden of smoking remains enormous; but the legacy of the 1964 Report is a society that has made impressive strides toward ridding itself of this most preventable source of disease, disability, and death.

1990 Health Objectives for the Nation

In 1979, PHS released the first Surgeon General's Report on Health Promotion and Disease Prevention (US DHEW 1979b). The Report identified 15 priority areas, including smoking, in which significant health gains could be expected in the 1980s, with appropriate actions. Subsequently, working with health experts from both the private and public sectors, the PHS established 226 specific health objectives for the Nation (US DHHS 1980b). Seventeen of these pertain directly to cigarette smoking (Table 2). Many others relate to smoking as well, because they address the prevention of heart disease, cancer, burn injuries, and other smoking-related disease problems. In 1986, the PHS published a midcourse assessment of progress toward achieving the 226 objectives (US DHHS 1986c). One of the goals of the present Report is to offer additional insight in this assessment as it relates to the 17 smoking objectives. This is discussed in the relevant chapters.

PHS is currently developing national health goals for the year 2000, again working with organizations and individuals in the private and public sectors. The reduction of

TABLE 2.—1990 health objectives for the nation pertaining to smoking

Reduced risk factors

1. By 1990, the proportion of adults who smoke should be reduced to below 25 percent.
2. By 1990, the proportion of women who smoke during pregnancy should be no greater than one-half the proportion of women overall who smoke.

Increased public/professional awareness

5. By 1990, the share of the adult population aware that smoking is one of the major risk factors for heart disease should be increased to at least 85 percent.
 6. By 1990, at least 90 percent of the adult population should be aware that smoking is a major cause of lung cancer, as well as multiple other cancers including laryngeal, esophageal, bladder, and other types.
 7. By 1990, at least 85 percent of the adult population should be aware of the special risk of developing and worsening chronic obstructive pulmonary disease, including bronchitis and emphysema, among smokers.
-

should 3. By 1990, the proportion of children and youth aged 12 to 18 years who smoke should be reduced to below 6 percent.

half the 4. By 1990, the sales-weighted average tar yield of cigarettes should be reduced to below 10 mg. The other components of cigarette smoke known to cause disease should also be reduced proportionately.

re that 8. By 1990, at least 85 percent of women should be aware of the special health risks for women who smoke, including the effect on outcomes of pregnancy and the excess risk of cardiovascular disease with oral contraceptive use.

tion lung 9. By 1990, at least 65 percent of 12-year-olds should be able to identify smoking cigarettes with increased risk of serious disease of the heart and lungs.

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MMWR

March 24, 1989

TABLE 2.—Continued

Improved services/protection

10. By 1990, at least 35 percent of all cigarettes should be offered employer/employee sponsored smoking cessation programs either at the workplace or in the community.

11. By 1985, tar, nicotine, and carbon monoxide levels should be prominently displayed on cigarette packs and promotional material.

12. By 1985, the present cigarette warning labels should be strengthened to increase their visibility and effectiveness. They should give the consumer additional needed information on specific multiple health risks of smoking and passive smoking. Consideration should be given to rotating the labels to identification of special vulnerable

Improved surveillance/evaluation

15. By 1985, insurance companies should be required to collect, review, and make public information on the differential life expectancy and hospital utilization by specific cause of death for smokers and nonsmokers, by sex.

16. By 1990, continuing epidemiologic studies should have delineated the unanswered research questions regarding low-yield cigarettes, and possible answers to these should have been given. Additional efforts.

SOURCE: US DHHS (1980b).

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13. By 1990, laws should exist in all 50 States and all jurisdictions prohibiting smoking in enclosed public places, and establishing separate smoking areas at work and in dining establishments.

14. By 1990, major health and life insurers should be offering differential insurance premiums to smokers and nonsmokers.

17. By 1990, in addition to biomedical hazard surveillance, continuing examination of the changing tobacco product and the sociological phenomena resulting from those changes should have been accomplished.

tobacco use is one of 21 priority areas in which objectives are being formulated. PHS intends to publish the objectives in 1990.

Limitations of Coverage

Despite the broad scope of this Report, certain limitations have had to be placed on coverage. Two in particular are worthy of mention here:

(1) The Report focuses primarily, but not exclusively, on cigarette smoking, reflecting its dominance among forms of tobacco use, in terms of both prevalence and disease impact. This focus also reflects the desire to represent the principal interest of the 1964 Advisory Committee in this 25th anniversary Report. Pipe and cigar smoking are much less prevalent than cigarette smoking but also carry significant health risks (US DHEW 1979a). Growing use of smokeless tobacco products (snuff and chewing tobacco), primarily by adolescent males, has focused national attention on the prevalence and health consequences of using these tobacco products (Connolly et al. 1986). This subject was recently reviewed thoroughly by an advisory committee to the Surgeon General (US DHHS 1986b) and in a National Cancer Institute monograph (Boyd and Darbey, in press).

(2) The Report concentrates on smoking in the United States. Both within the United States and around the world, there is growing concern about the spread of smoking, particularly in the world's poorer countries. While per capita cigarette consumption is stable or falling in most developed nations, it is rising in Third World countries. Rates of smoking-related chronic diseases are also increasing rapidly, to the point that tobacco is expected to soon become the leading cause of premature, preventable mortality in the Third World, as it is at present in the developed world (Aoki, Hisamichi, Tominaga 1988).

Concentration of this Report on smoking in the United States is no reflection on the relative importance of the international situation. Rather, it results from the principal objective of reviewing where this Nation has come in its efforts to control smoking-related disease since the 1964 report of the Surgeon General's Advisory Committee. The Public Health Service hopes that this review, like its predecessors, will prove to be of value to scientists, health professionals, and public health officials in countries throughout the world.

Development of the Report

This Report was developed by the Office on Smoking and Health (OSH), Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control, Public Health Service of the U.S. Department of Health and Human Services, as part of the Department's responsibility, under Public Law 91-222, to report new and current information on smoking and health to the U.S. Congress.

The scientific content of this Report was produced through the efforts of more than 130 scientists in the fields of medicine, the biological and social sciences, public health, and policy analysis. Manuscripts for the Report, constituting drafts of chapters or sections of chapters, were prepared by 33 scientists selected for their expertise in the

specific content areas. An editorial team including the Director of OSH, a medical epidemiologist from OSH, and four non-Federal experts edited and consolidated the individual manuscripts into chapters. These draft chapters were subjected to an intensive outside peer review, with each chapter reviewed by 5 to 12 individuals knowledgeable about the chapter's subject matter. Incorporating the reviewers' comments, the editors revised the chapters and assembled a draft of the complete Report. The draft Report was then submitted to 25 distinguished scientists for their review and comment on the entirety of its contents. Simultaneously, the draft Report was submitted to 9 institutes and agencies within the U.S. Public Health Service for their review. Comments from the senior scientific reviewers and the agencies were then used to prepare the final draft of the Report, which was then reviewed by the Offices of the Assistant Secretary for Health and the Secretary, Department of Health and Human Services.

Chapter Conclusions

Chapter 2: Advances in Knowledge of the Health Consequences of Smoking

Part I. Health Consequences

1. The 1964 Surgeon General's Report concluded that cigarette smoking increases overall mortality in men, causes lung and laryngeal cancer in men, and causes chronic bronchitis. The Report also found significant associations between smoking and numerous other diseases.
2. Reports of the Surgeon General since 1964 have concluded that smoking increases mortality and morbidity in both men and women. Disease associations identified as causal since 1964 include coronary heart disease, atherosclerotic peripheral vascular disease, lung and laryngeal cancer in women, oral cancer, esophageal cancer, chronic obstructive pulmonary disease, intrauterine growth retardation, and low-birth-weight babies.
3. Cigarette smoking is now considered to be a probable cause of unsuccessful pregnancies, increased infant mortality, and peptic ulcer disease; to be a contributing factor for cancer of the bladder, pancreas, and kidney; and to be associated with cancer of the stomach.
4. Accumulating research has elucidated the interaction effects of cigarette smoking with certain occupational exposures to increase the risk of cancer, with alcohol ingestion to increase the risk of cancer, and with selected medications to produce adverse effects.
5. A decade ago, the 1979 Report of the Surgeon General found smokeless tobacco to be associated with oral cancer. In 1986, the Surgeon General concluded that smokeless tobacco was a cause of this disease.
6. Research in the present decade has established that involuntary smoking is a cause of disease, including lung cancer, in healthy nonsmokers, and that the children of parents who smoke have an increased frequency of respiratory infections and symptoms.

7. In 1964, tobacco use was considered habituating. A substantial body of evidence accumulated since then, and summarized in the 1988 Surgeon General's Report, has established that cigarettes and other forms of tobacco are addicting. Given the prevalence of smoking, tobacco use is the Nation's most widespread form of drug dependency.
8. Studies dating from the 1950s have consistently documented the benefits of smoking cessation for smokers in all age groups.
9. Recent evidence, including that presented in this 1989 Report of the Surgeon General, documents that cigarette smoking is a cause of cerebrovascular disease (stroke) and is associated with cancer of the uterine cervix.

Part II. The Physicochemical Nature of Tobacco

1. The estimated number of compounds in tobacco smoke exceeds 4,000, including many that are pharmacologically active, toxic, mutagenic, and carcinogenic.
2. Forty-three carcinogens have been identified in tobacco smoke.
3. Carcinogenic tobacco-specific nitrosamines are found in high concentrations in smokeless tobacco.

Chapter 3: Changes in Smoking-Attributable Mortality

1. Lung cancer death rates increased two- to fourfold among older male smokers over the two decades between the American Cancer Society's two Cancer Prevention Studies (CPS-I, 1959-65, and CPS-II, 1982-86). Lung cancer death rates for younger male smokers fell about 30 to 40 percent during this period.
2. Lung cancer death rates increased four- to sevenfold among female smokers aged 45 years or older in CPS-II compared with CPS-I, while lung cancer death rates among younger women declined 35 to 55 percent.
3. The two-decade interval witnessed a two- to threefold increase in death rates from chronic obstructive pulmonary disease (COPD) in female smokers aged 55 years or older.
4. There was no change in the age-adjusted death rates for lung cancer and COPD between CPS-I and CPS-II among men and women who never smoked regularly.
5. Overall death rates from coronary heart disease (CHD) declined substantially between CPS-I and CPS-II. The decline in CHD mortality among nonsmokers, however, was notably greater than among current cigarette smokers.
6. In CPS-II, the relative risks of death from cerebrovascular lesions were 3.7 and 4.8 for men and women smokers under age 65. Increased risks of stroke were also observed among older smokers and former smokers. Along with the recently reported results of other studies, these findings strongly support a causal role for cigarette smoking in thromboembolic and hemorrhagic stroke.
7. In 1985, smoking accounted for 87 percent of lung cancer deaths, 82 percent of COPD deaths, 21 percent of CHD deaths, and 18 percent of stroke deaths. Among men and women less than 65 years of age, smoking accounted for more than 40 percent of CHD deaths.

8. The large increase in smoking-attributable mortality among American women between 1965 and 1985 was a direct consequence of their adoption of lifelong cigarette smoking, especially from their teenage years onward.
9. In 1985, 99 percent of smoking-attributable deaths occurred among people who started smoking before the 1964 Surgeon General's Report. For this group, the annual smoking-attributable fatality rate is about 7,000 deaths per 1 million persons at risk.
10. For 10 causes of death, a total of 337,000 deaths were attributable to smoking in 1985. These represented 22 percent of all deaths among men and 11 percent among women. If other cardiovascular, neoplastic, and respiratory causes of death were included—as well as deaths among newborns and infants resulting from maternal smoking, deaths from cigarette-caused residential fires, and lung cancer deaths among nonsmokers due to environmental tobacco smoke—the total smoking-attributable mortality was about 390,000 in 1985.

Chapter 4: Trends in Public Beliefs, Attitudes, and Opinions About Smoking

1. In the 1950s, 40 to 50 percent of adults believed that cigarette smoking is a cause of lung cancer. By 1986, this proportion had increased to 92 percent (including 85 percent of current smokers).
2. Between 1964 and 1986, the proportion of adults who believed that cigarette smoking increases the risk of heart disease rose from 40 to 78 percent. A similar increase occurred among smokers, from 32 to 71 percent.
3. The proportion of adults who believed that cigarette smoking increases the risk of emphysema and chronic bronchitis rose from 50 percent in 1964 to 81 percent (chronic bronchitis) and 89 percent (emphysema) in 1986. These proportions increased among current smokers from 42 percent in 1964 to 73 percent (chronic bronchitis) and 85 percent (emphysema) in 1986.
4. Despite these impressive gains in public knowledge, substantial numbers of smokers are still unaware of or do not accept important health risks of smoking. For example, the proportions of smokers in 1986 who did not believe that smoking increases the risk of developing lung cancer, heart disease, chronic bronchitis, and emphysema were 15 percent, 29 percent, 27 percent, and 15 percent, respectively. These percentages correspond to between 8 and 15 million adult smokers in the United States.
5. In 1985, substantial percentages of women of childbearing age did not believe that smoking during pregnancy increases the risk of stillbirth (32 percent), miscarriage (25 percent), premature birth (24 percent), and having a low-birth-weight baby (15 percent). Of women in this age group, 28 percent did not believe that women taking birth control pills have a higher risk of stroke if they smoke.
6. Some smokers today do not recognize their own personal risk from smoking or they minimize it. In 1986, only 18 percent of smokers were "very concerned" about the effects of smoking on their health, and 24 percent were not at all concerned.

7. In 1986, about half of current smokers and 40 percent of never smokers incorrectly believed that a person would have to smoke 10 or more cigarettes per day before it would affect his or her health.
8. A national survey conducted in 1983 by Louis Harris and Associates found that the public underestimates the health risks of smoking compared with many other health risks.
9. Many smokers underestimate the population impact of smoking. In 1987, 28 percent of smokers (and 16 percent of the general population) disagreed with the statement, "Most deaths from lung cancer are caused by cigarette smoking."
10. The proportion of high school seniors who believe that smoking a pack or more of cigarettes per day causes great risk of harm increased from 51 percent in 1975 to 66 percent in 1986.
11. In 1986, about three-quarters of adults believed that using chewing tobacco or snuff is harmful to health.
12. The social acceptability of smoking in public is declining, as measured by the proportion of adults who find it annoying to be near a person smoking cigarettes. This proportion increased from 46 percent in 1964 to 69 percent in 1986.
13. A majority of the public favors policies restricting smoking in public places and worksites, prohibiting the sale of cigarettes to minors, and increasing the cigarette tax to fund the Medicare program. Recent surveys indicate that about half the public supports a ban on cigarette advertising.

Chapter 5: Changes in Smoking Behavior and Knowledge About Determinants

Part I. Changes in Smoking Behavior

1. Prevalence of cigarette smoking has declined substantially among men, slightly among women, and hardly at all among those without a high school diploma. From 1965-87, the prevalence of smoking among men 20 years of age and older decreased from 50.2 to 31.7 percent. Among women, the prevalence of smoking decreased from 31.9 to 26.8 percent. Smoking prevalence among whites fell steadily. Among blacks, the prevalence of smoking changed very little between 1965 and 1974; subsequently, prevalence declined at a rate similar to that of whites during the same period. Smoking prevalence has consistently been higher among blue-collar workers than among white-collar workers.
2. Annual per capita sales of manufactured cigarettes (18 years of age and older) decreased from 4,345 cigarettes in 1963 to 3,196 in 1987, a 26-percent reduction. Total cigarette sales increased gradually to 640 billion cigarettes in 1981 and then fell to 574 billion in 1987.
3. In 1965, 29.6 percent of adults who had ever smoked cigarettes had quit. This proportion (quit ratio) increased to 44.8 percent in 1987. The rate of increase in the quit ratio from 1965-85 was similar for men and women. The rate of change in quitting activity in recent years is similar for whites and blacks. From 1965-85, the quit ratio increased more rapidly among college graduates than among adults without a high school diploma.

4. Of all adults who smoked at any time during the year 1985-86, 70 percent had made at least one serious attempt to quit during their lifetime and one-third stopped smoking for at least 1 day during that year.
5. The age of initiation of smoking has declined over time, particularly among females. Among smokers born since 1935, more than four-fifths started smoking before the age of 21.
6. Trends in prevalence of cigarette smoking among those aged 20 to 24 years are an indicator of trends in initiation. By this measure, initiation has declined between 1965 and 1987 from 47.8 to 29.5 percent. Initiation has fallen four times more rapidly among males than among females. The rate of decline has been similar among whites and blacks. Initiation has decreased three times more rapidly among those with 13 or more years of education than among those with less education.
7. The prevalence of daily cigarette smoking among high school seniors decreased from 29 percent in 1976 to 21 percent in 1980, after which prevalence leveled off at 18 to 21 percent. Prevalence among females has consistently exceeded that among males since 1977. Prevalence was lower for students with plans to pursue higher education than for those without such plans. The difference in prevalence by educational plans widened throughout this period; in 1987, smoking rates were 14 percent and 30 percent in these two groups, respectively.
8. The best sociodemographic predictor of smoking patterns appears to be level of educational attainment. Marked differences in smoking prevalence, quitting, and initiation have occurred and have increased over time between more and less educated people.
9. The domestic market share of filtered cigarettes increased from 1 percent in 1952 to 94 percent in 1986. The market share of low-tar cigarettes (15 mg or less) increased from 2 percent in 1967 to 56 percent in 1981, after which this proportion fell slightly and then stabilized at 51 to 53 percent. The market share of longer cigarettes (94 to 121 mm) increased from 9 percent in 1967 to 40 percent in 1986.
10. Between 1964 and 1986, use of smokeless tobacco (snuff and chewing tobacco) declined among men and women 21 years of age and older. However, among males aged 17 to 19, snuff use increased fifteenfold and use of chewing tobacco increased more than fourfold from 1970-86.
11. Differences in prevalence of cigarette smoking and smokeless tobacco use between young males and young females suggest that the prevalence of any tobacco use is similar in these two groups.
12. From 1964 to 1986, the prevalence of pipe and cigar smoking declined by 80 percent among men.

Part II. Changes in Knowledge About Determinants of Smoking Behavior

1. Smoking was viewed as a habit in 1964 and is now understood to be an addiction influenced by a wide range of interacting factors, including pharmacologic effects of nicotine; conditioning of those effects to numerous activities, emotions, and settings; socioeconomic factors; personal factors such as coping resources; and social influence factors.

2. Since 1964, there has been a gradual evolution of understanding of the progression of smoking behavior through the broad stages of development, regular use, and cessation. Each of these stages is differentially affected by multiple and interacting determinants.
3. Views of determinants of smoking are affected by the predominating theoretical and methodological perspectives. In smoking, the earlier focus on broad, dispositional variables (e.g., extraversion) has given way to an emphasis on situation-specific and interactional variables; a focus on a search for a single cause has given way to a focus on multiple and interacting causes.

Chapter 6: Smoking Prevention, Cessation, and Advocacy Activities

Part I. Smoking Prevention Activities

1. Diverse program approaches to the prevention of smoking among youth grew out of antismoking education efforts in the 1960s. These approaches include media-based programs and resources; smoking prevention as part of multicomponent school health education; psychosocial prevention curricula; and a variety of other resources developed and sponsored by professional and voluntary health organizations, Federal and State agencies, and schools and community groups.
2. Psychosocial curricula addressing youths' motivations for smoking and the skills they need to resist influences to smoke have emerged as the program approach with the most positive outcomes. Evolution in program content has been accompanied by a shift since the 1960s in prevention program focus from youths in high school and college to adolescents in grades 6 through 8.
3. Existing prevention programs vary greatly in the extent to which they have been evaluated and used. Psychosocial prevention curricula have been intensively developed over the last decade and have been the most thoroughly evaluated and best documented; however, they are generally not part of a dissemination system. More widely disseminated smoking prevention materials and programs, such as those using mass media and brochures, have not always been as thoroughly evaluated; however, they have achieved wider use in the field.
4. The model of stages of smoking behavior acquisition underlies current smoking prevention programs and suggests new intervention opportunities, ranging from prevention activities aimed at young children to cessation programs for adolescent smokers.
5. There has been and continues to be a lack of smoking prevention programs that target youth at higher risk for smoking, such as those from lower socioeconomic backgrounds or school dropouts.

Part II. Smoking Education and Cessation Activities

1. During the past 25 years, national voluntary health agencies, especially the American Cancer Society, the American Heart Association, and the American

Lung Association, have played a significant role in educating the public about the hazards of tobacco use.

2. Individual and group smoking cessation programs evolved from an emphasis on conditioning-based approaches in the 1960s, to the cognitively based self-management procedures of the 1970s, to the relapse prevention and pharmacologically based components of the 1980s.
3. There has recently been an increased emphasis on targeting specific groups of smokers for cessation activities (e.g., pregnant women, Hispanics, blacks).
4. Packaging and marketing of self-help smoking cessation materials have become more sophisticated and there is more of an emphasis on relapse prevention, while much of the contents have changed relatively little over the years.
5. Mass-mediated quit-smoking programs have become an increasingly popular strategy for influencing the smoking behavior of a large number of smokers.
6. The 1980s have seen an increase in the promotion of smoking control efforts in the workplace in response to increasing demand and opportunity for worksite wellness programs and smoking control policies.
7. In the last decade there has been an increasing interest in involving physicians and other health care professionals in smoking control efforts. Medical organizations have played a more prominent role in smoking and health during the 1980s than they had in the past.

Part III. Antismoking Advocacy and Lobbying

1. Lobbying and advocacy efforts have expanded through the increasing commitment of the national voluntary health agencies to political action and the formation of coalitions at the local, State, and national levels.
2. Antismoking advocacy and lobbying have evolved over the past 25 years and now focus on a growing number of local, State, and national legislative and regulatory initiatives designed to reduce smoking, regulate the cigarette product, and prevent the uptake of smoking by children and adolescents.

Chapter 7: Smoking Control Policies

Part I. Policies Pertaining to Information and Education

1. The Federal Government's efforts to reduce the health consequences of cigarette smoking have consisted primarily of providing the public with information and education about the hazards of tobacco use. Two of the most well-known mechanisms are the publication of Surgeon General's Reports and the requirement of warning labels on cigarette packages. A system of rotating health warning labels is now required for all cigarette and smokeless tobacco packaging and advertisements.
2. Current laws do not require health warning labels on all tobacco products and do not require monitoring of the communications effectiveness of the warnings. Furthermore, existing laws do not provide administrative mechanisms to update the

contents of labels to prevent the overexposure of current messages or to reflect advances in scientific knowledge, such as new information about the addictive nature of tobacco use.

3. There is insufficient evidence to determine the independent effect of cigarette warning labels, particularly the rotating warning labels required since 1985, on public knowledge about the health effects of smoking or on smoking behavior.
4. Information about tar and nicotine yields appears on all cigarette advertisements but not on all cigarette packages. Levels of other hazardous constituents of tobacco smoke, such as carbon monoxide, hydrogen cyanide, and ammonia, are not disclosed on packages or advertisements. Little information is available to the public about the identity or health consequences of the additives in tobacco products.
5. Declines in adult per capita cigarette consumption have occurred in years of major dissemination of information on the health hazards of smoking. These include 1964, the year of the first Surgeon General's Report on smoking and health, and 1967-70, when antismoking public service announcements were widely broadcast on radio and television, as mandated by the Federal Communications Commission's Fairness Doctrine.
6. In 1985, when cigarette advertising and promotion totaled 2.5 billion dollars, cigarettes were the most heavily advertised product category in the outdoor media (e.g., billboards), second in magazines, and third in newspapers. Over the past decade, the majority of cigarette marketing expenditures has shifted from traditional print advertising to promotional activities (e.g., free samples, coupons, sponsorship of sporting events).
7. An estimated 1 percent of the budget allocated to disease prevention by the U.S. Department of Health and Human Services is devoted specifically to tobacco control. These expenditures totaled 39.5 million dollars in 1986.

Part II. Economic Incentives

1. Cigarette excise taxes are imposed by the Federal Government (16 cents per pack), all State governments, and nearly 400 cities and counties. On average, Federal and State excise taxes add 34 cents per pack to the price of cigarettes. Cigarette excise tax rates have fallen since 1964 in real terms because the rate and magnitude of periodic tax increases have not kept pace with inflation.
2. Studies demonstrate that increases in the price of cigarettes decrease smoking, particularly by adolescents. It has been estimated that an additional 100,000 or more persons will live to age 65 as a result of the price increases induced by the 1983 doubling of the Federal excise tax on cigarettes.
3. In 1964, smoking status was not considered in the determination of insurance premiums. Currently, nearly all life insurers but only a few health, disability, and property and casualty insurers offer premium discounts for nonsmokers. Few health insurers reimburse for the costs of smoking cessation programs or treatment.

Part III. Direct Restrictions on Smoking

1. Restrictions on smoking in public places and at work are growing in number and comprehensiveness, as a result of both Government actions and private initiatives. Forty-two States and more than 320 communities have passed laws restricting smoking in public, and an estimated one-half of large businesses have a smoking policy for their employees.
2. The goal of these smoking restrictions is to protect individuals from the consequences of involuntary tobacco smoke exposure, but they may also contribute to reductions in smoking prevalence by changing the attitudes and behavior of current and potential smokers. Insufficient research has been undertaken to determine the extent, if any, of these effects.
3. There are fewer legal restrictions on children's access to tobacco products now than in 1964, despite what has been learned since then about the dangers of tobacco use, its addictive nature, and the early age of initiation of smoking.
4. As of January 1, 1988, laws in 43 States and the District of Columbia restricted the sale of cigarettes to minors. Nevertheless, tobacco products are relatively easy for children to obtain through vending machines and over-the-counter purchases because of low levels of compliance with and enforcement of current laws.
5. Tobacco products have been exempted by law or administrative decision from the jurisdiction of Federal regulatory agencies under whose authority they might otherwise fall.

Chapter 8: Changes in the Smoking-and-Health Environment: Behavioral and Health Consequences

1. All birth cohorts born between 1901 and 1960 experienced reductions in the prevalence of smoking relative to the rates that would have been expected in the absence of the antismoking campaign. By 1985, the gap between actual (reported) prevalence and that which would have been expected ranged from 6 percentage points for the eldest female cohort to 28 percentage points for the youngest male cohort.
2. In 1985, an estimated 56 million Americans 15 to 84 years of age were smokers. In the absence of the antismoking campaign, an estimated 91 million would have been smokers.
3. Adult per capita cigarette consumption has fallen 3 to 8 percent in years of major smoking-and-health events, such as publication of the first Surgeon General's Report on smoking and health in 1964. Per capita consumption fell each of the years the Fairness Doctrine antismoking messages were presented on television and radio (1967-70).
4. By 1987, adult per capita cigarette consumption would have exceeded its actual level by an estimated 79 to 89 percent had the antismoking campaign never occurred.
5. One of the most substantial behavioral responses to concerns about smoking and health has been the shift toward filtered cigarettes in the 1950s and low-tar and

low-nicotine cigarettes in the 1970s. The net health impact of these product changes is unknown.

6. As a result of the antismoking campaign, an estimated 789,000 deaths were postponed during the period 1964 through 1985, 112,000 in 1985 alone. The average life expectancy gained per postponed death was 21 years.
7. The avoidance of smoking-related mortality associated with the antismoking campaign will represent a growing percentage of smoking-related mortality over time, as the principal beneficiaries of the campaign, younger men and women, reach the ages at which smoking-related disease is most common. Campaign-induced quitting and noninitiation through 1985 will result in the postponement or avoidance of an estimated 2.1 million smoking-related deaths between 1986 and the year 2000.

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GLOSSARY

AAFP	American Academy of Family Physicians
AAP	American Academy of Pediatrics
AARC	American Association for Respiratory Care
AC	advisory committee
ACCP	American College of Chest Physicians
ACHE	American College of Healthcare Executives
ACS	American Cancer Society
ADAMHA	Alcohol, Drug Abuse, and Mental Health Administration
AHA	American Heart Association
ALA	American Lung Association
AMA	American Medical Association
ANR	Americans for Nonsmokers' Rights
AR	attributable risk
ASH	Action on Smoking and Health
ASHA	American School Health Association
AUTS	Adult Use of Tobacco Survey
BATF	Bureau of Alcohol, Tobacco, and Firearms
BART	Bay Area Rapid Transit
BC/BS	Blue Cross-Blue Shield
BIOSEP	Biofeedback Smoking Education Project
BRFS	Behavioral Risk Factor Surveillance System
CAB	Civil Aeronautics Board
CC	Consensus Conference
CDC	Centers for Disease Control
CHD	coronary heart disease
CIS	Cancer Information Service
CNR	Californians for Nonsmokers' Rights
CNS	central nervous system
CO	carbon monoxide
COHb	carboxyhemoglobin
COLD	chronic obstructive lung disease
CPD	chronic obstructive pulmonary disease
CPS	Current Population Survey
CPS-I	Cancer Prevention Study I
CPS-II	Cancer Prevention Study II
CPSA	Consumer Product Safety Act

CPSC	Consumer Product Safety Commission
CVD	cardiovascular disease
DBP	diastolic blood pressure
DHHS	Department of Health and Human Services
DOC	Doctors Ought to Care
DOD	Department of Defense
EPA	Environmental Protection Agency
ETS	environmental tobacco smoke
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDA	Food and Drug Administration
FEV ₁	1-sec forced expiratory volume
FFDCA	Federal Food, Drug, and Cosmetic Act
FHSA	Federal Hazardous Substance Labeling Act
FTC	Federal Trade Commission
FTE	full-time equivalents
GASO	Great American Smokeout
GASP	Group Against Smoking Pollution
GSA	General Services Administration
HCN	hydrogen cyanide
HDL	high density lipoprotein cholesterol
HES	Health Examination Survey
HHANES	Hispanic Health and Nutrition Examination Survey
HIAA	Health Insurance Association of America
HMO	health maintenance organization
HRSA	Health Resources and Services Administration
IAC	Interagency Committee
ICC	Interstate Commerce Commission
ICD-9	International Classification of Diseases, Ninth Revision
ICD-7	International Classification of Diseases, Seventh Revision
IPPB	Intermittent Positive Pressure Breathing Trial
IQ	I Quit
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
LFL	"Live for Life"
LIRR	Long Island Railroad
MBTA	Massachusetts Bay Transportation Authority
MRFIT	Multiple Risk Factor Intervention Trial
MS	mainstream smoke
NAB	N'-nitrosoanabasine
NAIC	National Association of Insurance Commissioners
NASHS	National Adolescent Student Health Survey
NAT	N'-nitrosoanatabine
NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NCSH	National Clearinghouse for Smoking and Health

NDN	National Diffusion Network
NHANES	National Health and Nutrition Examination Survey
NHES	National Health Examination Survey
NHIS	National Health Interview Survey
NHLBI	National Heart, Lung, and Blood Institute
NICHD	National Institute of Child Health and Human Development
NIDA	National Institute on Drug Abuse
NIH	National Institutes of Health
NNK	4-(methylnitrosoamino)-1-(3-pyridyl)-1-butanone
NNN	N'-nitrosonornicotine
NNS	National Natality Survey
NRC	National Research Council
NSBA	National School Boards Association
NSDA	National Survey on Drug Abuse
NSFG	National Survey of Family Growth
OASH	Office of the Assistant Secretary for Health
OCC	Office of Cancer Communications
OSH	Office on Smoking and Health
OSHA	Occupational Safety and Health Administration
OTA	Office of Technology Assessment
PAH	polynuclear aromatic hydrocarbons
ppb	parts per billion
PSAs	public service announcements
RJR	R.J. Reynolds Tobacco Company
SCN ⁻	thiocyanate
SEP	Smoking Education Program
SES	socioeconomic status
SHCP	School Health Curriculum Program
SHD	State Health Department
SS	sidestream smoke
ST	smokeless tobacco
STAT	Stop Teenage Addiction to Tobacco
STCP	Smoking, Tobacco, and Cancer Program
TEFRA	Tax Equity and Fiscal Responsibility Act
TPLP	Tobacco Products Liability Project
TSG	Technical Study Group
TSNA	tobacco-specific N-nitrosamine
USDA	U.S. Department of Agriculture
USP	U.S. Pharmacopeia
WHO	World Health Organization







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